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Short Term Measurements and Air Quality Messaging/ Regulatory Requirements for Data

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July 9, 2015

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Emerging air monitoring systems (informal classification)

existing

Group 1: Regulatory or regulatory-equivalent air monitoring stations
Cost: 100Ks (in thousands), Data reliability = A+

emerging

Group 2: Smaller-footprint monitoring systems for community screening and research studies
Cost: 1-10Ks, Data reliability = B+ (target)

Group 3: Very small, very low cost systems enabling dense sensor networks, citizen science
Cost: 0.1-1Ks, Data reliability = ?

(slide courtesy of Gayle Hagler)

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Monitoring Requirements for NAAQS Compliance

Activity/Procedure	Regulation
FRM/FEM Instrument Approval (1-2 year process)	40 CFR Part 53.20 40 CFR Part 58 Appendix C Ambient Air Monitoring Methodology
Meet method requirements for NAAQS attainment	40 CFR Part 50 Appendices
QAPP approval	40 CFR Part 58 Appendix A and EPA QA Policy
Minimum QA/QC Requirements (e.g. calibration, zero/span checks)	40 CFR Part 58 Appendix A QA Handbook Volume II
Siting Requirements	40 CFR Part 58 Appendix E
Annual Data Certification	40 CFR Part 58.15
Meet reporting requirements	40 CFR Part 58.15

National Air Toxics Trends Stations (NATTS) information can be found at http://www.epa.gov/ttn/amtic/natts.html
Methods and Procedures for Source Testing and Monitoring http://www.epa.gov/ttn/emc/tmethods.html

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Communicating Sensor Data is Tricky…

There are no studies to support 1-minute ozone and $PM_{2.5}$ ***health effects*** messaging

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The Air Quality Index

Not for use to interpret non-regulatory data

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	*..air quality conditions are:*	*...as symbolized by this color:*
0-50	Good	Green
51-100	Moderate	Yellow
101-150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

AQI focuses on health effects experienced within a few hours or days

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Sensor Concentration ≠ Air Quality Index

Sensor Reading
Concentration
Short term (e.g. 1 minute)
Data Quality Unknown

Air Quality Index
Index Color
Averaged (e.g. 8-hour, 24-hour)
Data Quality Assured

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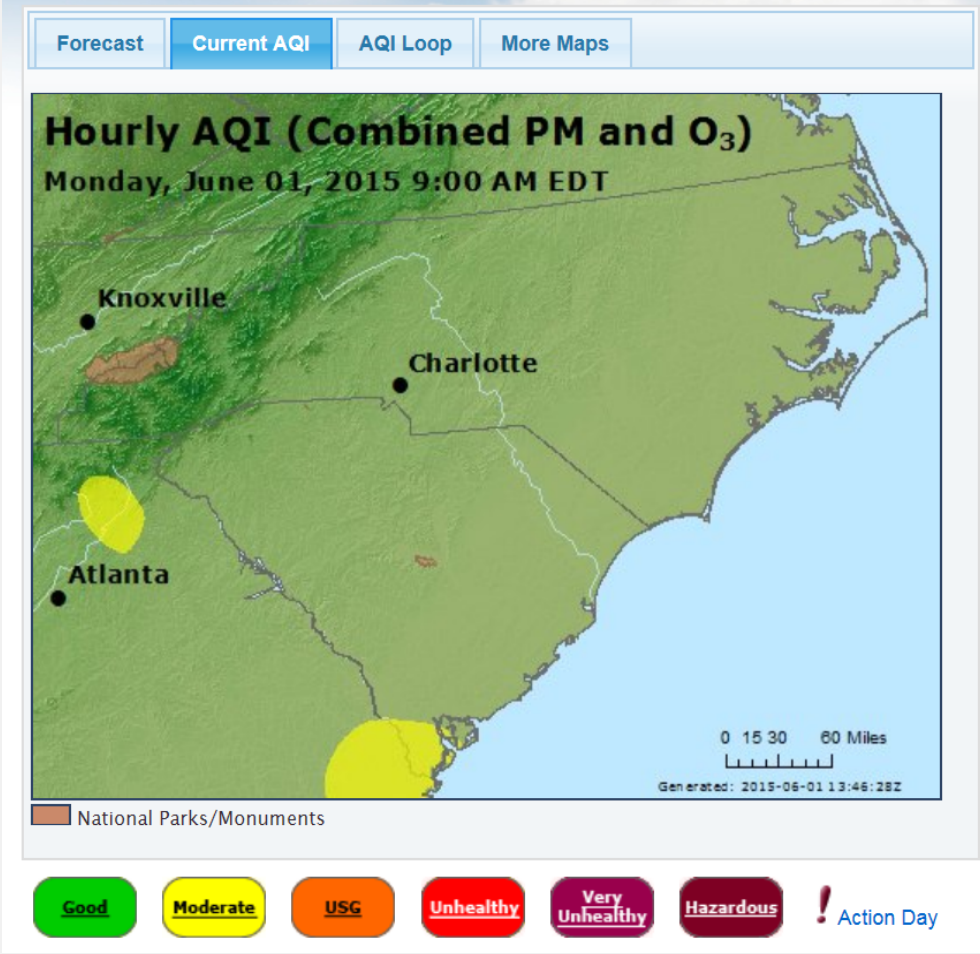


Air Quality Forecast

Today's High	Tomorrow's High
Air Quality Index (AQI)	Air Quality Index (AQI)
41 Good	Good
Health Message: None	Health Message: None

AQI - Pollutant Details

Ozone	41	Good	Particles (PM2.5)		Good
Particles (PM2.5)	36	Good	Ozone		Good

Current Conditions

Air Quality Index (AQI)
observed at 9:00 EDT

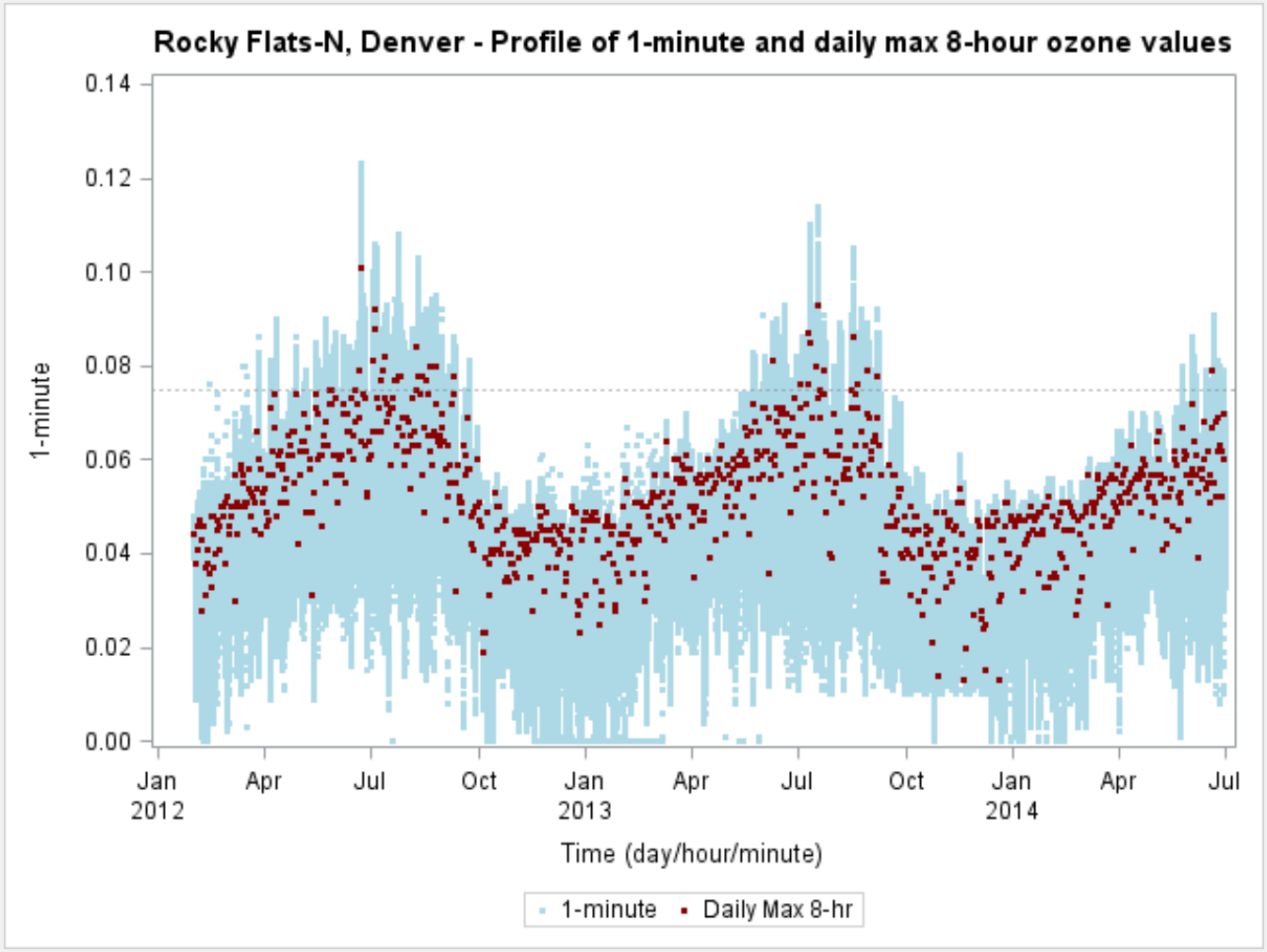
15 **Good**

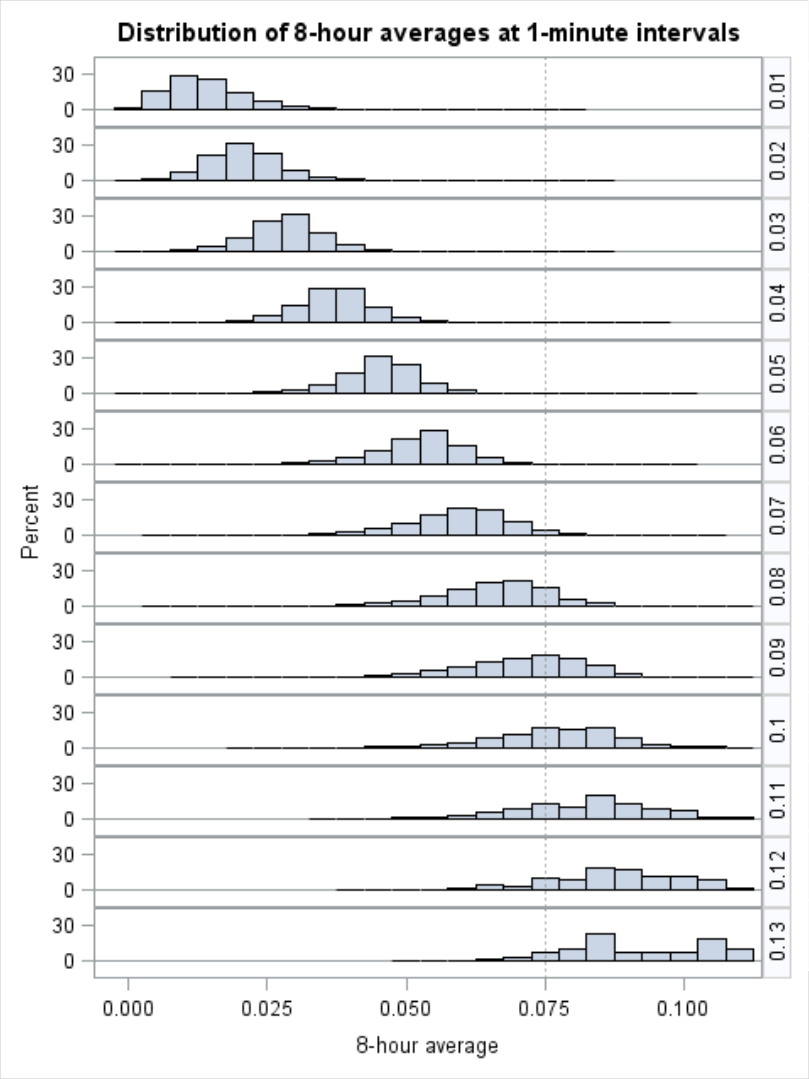
Health Message: None

AQI - Pollutant Details

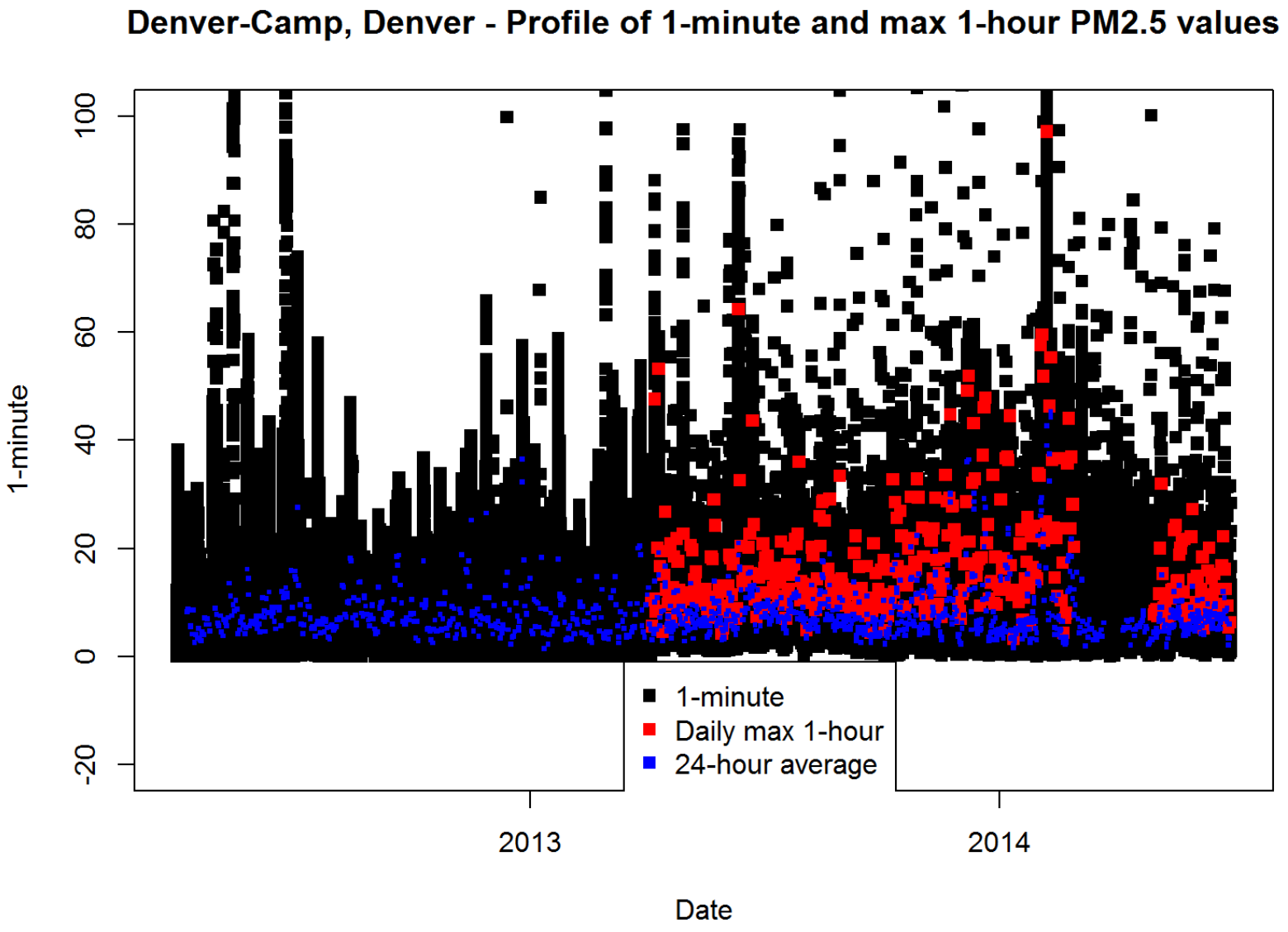
Particles (PM2.5)	15	Good

Past Air Quality Maps and Data





Percent of 8-hr averages > .075 ppm
~ 0
~ 0
~ 0
~ 0
~ 0
0.5%
5%
19%
37%
56%
70%
84%
89%



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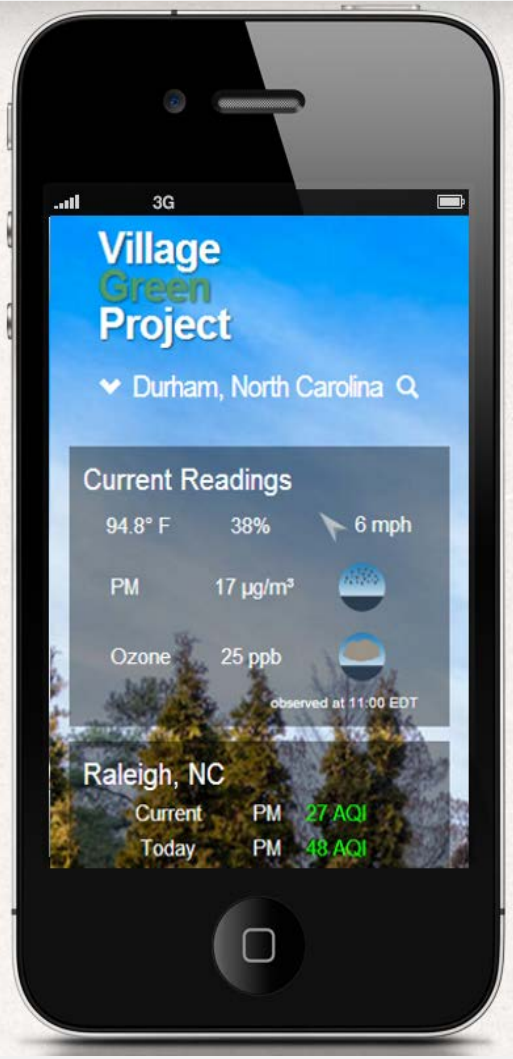
- Village Green *(funded by E-Enterprise)*
  - Incorporate real-time, 1-minute ozone and $PM_{2.5}$ sensor data into AIRNow tech
  - Expand number of sites (4-5)
  - Monitor additional pollutants (VOCs and NO_2)
  - Fulfill Agency priority goal for two real time air quality data streams to the public


3G
Village
Green
Project
Durham, North Carolina
Current Readings
94.8° F
38%
6 mph
PM
17 µg/m³
Ozone
25 ppb
observed at 11:00 EDT
Raleigh, NC
Current PM 27 AQI
Today PM 48 AQI


Village
Green
Project
Durham, North Carolina
Current Readings
94.8° F
38%
6 mph
PM
17.0 µg/m³
Ozone
25.0 ppb
observed at 18:00 EDT
Raleigh, NC
Current PM 27 AQI
Today PM 48 AQI
Tomorrow PM 57 AQI
source: AIRNow
Trends
Ozone
PM2.5
ppb
50
40
30
20
10
0
00:00 AM
01:00 AM
02:00 AM
03:00 AM
04:00 AM
05:00 AM
06:00 AM
07:00 AM
08:00 AM
09:00 AM
10:00 AM
11:00 AM
Ozone
Highcharts.com

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Messaging Activities

- Sensor Messaging Website
- Village Green Mobile Website

- Data Analysis (Completed)
- Focus Group Testing (In progress)

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Questions from Citizens

- Why is this reading different from what AIRNow shows?
- Why do you use hourly or longer averages to set standards? What do shorter peaks in my short term data mean?
- Can I use my information for comparison against the National Ambient Air Quality Standards (NAAQS)?

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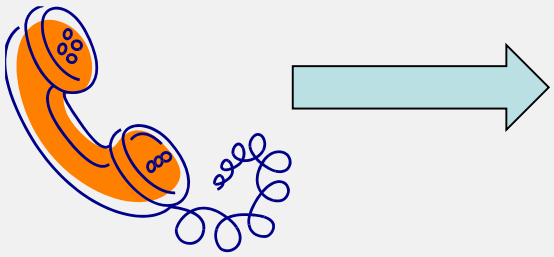
CONTACTS:

- Local/State Air Agencies
  - NACAA
  - AAPCA
- EPA
- Others



RESPONSE:

- Not FEM/FRM Quality (ambient)
- Not an approved test/alternative method (source)
- No action
- Check the AQI

Inconsistent/inaccurate information without guidance

Acknowledgements

OAQPS Team

- Kristen Benedict *(Team Lead)*
- Bryan Hubbell
- Michael Stewart
- Alison Davis
- Holly Wilson
- Susan Stone
- Phil Lorang
- Nicholas Swanson
- David Mintz
- Michelle Wayland
- Melissa Dreyfus
- Mike Papp
- Jason DeWees
- Kirk Baker
- James Hemby
- Ron Evans
- Chris Chapman
- Brad Johns
- John White
- Phil Dickerson
- Richard Wayland
- Melissa Payne

Collaborations